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THE COMMERCIAL FUMIGATION OF MEAT PRODUCTS
WITH METHYL BROMIDE AT
CAMP PACKING COMPANY INC. CORTLAND, NEW YORK

86-87002/35

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CONTAINS NO CBI

By
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(A Private Communication)

SUMMARY

SEP - 4 1987

Under a directive given to Dr. H. C. Spencer by Mr. R. M. Mehurin, Chief Laboratory Section, Meat Inspection Division of Bureau of Animal Industry U.S.D.A., the meat packing plant of the Camp Packing Company Inc. of Cortland New York was fumigated with methyl bromide. The actual fumigation was directed by Mr. James Schufeldt a commercial fumigator under the close supervision of Dr. J. D. Puppel, Inspector in Charge. Excellent control of the planted insects and the natural infestation was obtained. No off odors attributable to the fumigation were noted after exposure in any articles in the fumigated area. The total bromide concentration found in the meat and meat products were of the same order as found in many food products fumigated in the same manner with methyl bromide.

Introduction

In the fall of 1948 an experimental fumigation with methyl bromide of the Cudahy Brothers Company, Cudahy, Wisconsin plant was conducted. One room of this meat packing plant was fumigated in accordance with the authority granted by Mr. R. M. Mehurin as given in a letter to J. L. Maxwell dated September 7, 1948. The data obtained were discussed in a conference

held May 18, 1949 at the Meat Inspection Division in Washington, D. C. At that time it was agreed that the next step should be the fumigation of a meat packing plant under commercial conditions. Accordingly, Mr. R. M. Mehurin, Chief Laboratory Section, Meat Inspection Division, Bureau of Animal Industry, United States Department of Agriculture, Washington 25, D. C. granted to Dr. H. C. Spencer of The Dow Chemical Company, in a letter of February 20, 1951, the authority to conduct a trial fumigation with methyl bromide at the Camp Packing Company, Inc. Cortland, New York. Dr. J. D. Puppel, the Inspector in Charge, was appointed supervisor for the tests and were witnessed by him. The commercial fumigator in charge was Mr. James Shufelt of the McLeod Industrial Fumigators, Inc., 324 Broadway Street, Buffalo, New York.

The purpose of this experiment was to determine the efficiency of methyl bromide for the control of meat packing plant pests and to determine the effect of this gas on various kinds of meat and meat products when fumigated under commercial conditions.

Experimental Procedure

General Description of Plant

The entire plant was constructed of cement block. The floors were either cement or glazed tile. The windows were metal frame. Several of the rooms fumigated had skylights.

Description of Fumigated Areas

The area to be fumigated in the Camp Packing Company consisted of the killing floor, rendering room, Dr. Puppel's Meat Inspection office, men's locker room, and an office used by the supervision. The killing floor was connected to the offices and

locker room by a common hall. This was on one floor. The rendering room was one of many rooms in the basement. This room was located directly below the killing room and was so closely tied to the killing room that sealing would have been difficult. Thus the rendering room was included.

The killing room contained 51,264 feet. The offices and connecting hall contained 11,736 cu. ft. Thus the first floor space fumigated contained 63,000 cu. ft. The rendering room was found to contain 18,800 cu. ft.

Method of Sealing

Sealing was accomplished with the use of kraft paper or wrapping paper held in place with either masking tape or strips of kraft paper coated with petroleum jelly.

Placement of Meat Samples Exposed to the Fumes

The meat and meat product samples to be exposed to the gas fumes were placed on a table in a metal tray in Dr. Puppel's office. A paper was laid in the tray and the samples spread out as much as possible to expose the greatest amount of surface. The following quantities and materials were exposed:

Table 1 - Meat and Meat Products Exposed to the Fumes of Methyl Bromide at the Camp Packing Company, Inc., Plant in Cortland, New York.

<u>Product</u>	<u>Amount</u>	<u>How Exposed</u>
Frankfurter sausage in form of wieners	2 lbs.	Spread out in single layer
Pork sausage as link sausage	2 lbs.	Spread out in single layer
Beef fat	8-10 lbs.	In chunk
Lard	2 lbs.	In pound blocks
Pickling brine	1/2 gallon	In stainless steel bucket

Treatment of Unfumigated Meat Products

The unfumigated control samples were laid out in a metal tray in much the same manner and placed in one of the refrigerators which was not in the fumigation area. The brine was bottled and then placed in the tray with the rest of the control samples.

Placement of Laboratory Insects

Shortly before the gas was released, test insects consisting of confused flour beetles in plastic cages and the egg, large nymph and adult stages of American and German roaches in glass bottles were planted throughout the fumigated area. The locations are given in Table 2.

Table 2 - The Placement of Test Insects in the Fumigated Area of the Camp Packing Company, Inc. During the Experimental Methyl Bromide Fumigation.

<u>Cage No.</u>	<u>Insect</u>	<u>Where Placed</u>
<u>First Floor</u>		<u>Supervision Office</u>
1	American Roach	In wastebasket along outside wall at floor level
2	German Roach	On filing cabinet on inside wall at eye level
2	C.F.B.*	On shelf by window head high
65	C.F.B.	On window ledge
3	American Roach	<u>Men's Locker Room</u> By door on floor
29	C.F.B.	In pocket of coat hanging in locker
4	German Roach	1.5 Feet off floor in corner by radiator
X	C.F.B.	On top of towel holder by window at eye level
5	American Roach	In soap dish in shower

*C.F.B. = Confused flour beetle adults.

(Table 2 continued)

<u>Case No.</u>	<u>Insect</u>	<u>Where Placed</u>
<u>First Floor</u>		<u>Men's Locker Room</u>
6	German Roach	On floor by outside wall
		<u>Dr. Pundel's Office</u>
2	C.F.B.	Over door on jamb 8-9 feet off floor
20	C.F.B.	In desk drawer
7	American Roach	In desk drawer
8	German Roach	In desk drawer
119	C.F.B.	On floor in corner of room by outside wall
		<u>Killing Floor</u>
16	German Roach	On floor by south wall in condemn room
15	German Roach	On floor near stomach washer along west wall
12	American Roach	On floor in northwest corner of condemn room
99	C.F.B.	On shelf by fan near window in west wall
68	C.F.B.	On floor by bone disposer
11	American Roach	On shelf by wash stand for beef 6 feet off floor
115	C.F.B.	By drain in beef washer
110	C.F.B.	On floor by scales (on outside wall)
9	American Roach	On board by inside wall 6 feet up
13	German Roach	On towel rack in center of room
10	American Roach	On floor near door where live beef is admitted
14	German Roach	On walkway for killer by west window

(Table 2 continued)

<u>Case No.</u>	<u>Insect</u>	<u>Where Placed</u>
<u>First Floor</u>		<u>Killing Floor</u>
32	C.F.B.	On floor in northeast corner of room
34	C.F.B.	On knife sharpener stand
		<u>Hall</u>
47	C.F.B.	On tool chest by double doors
51	C.F.B.	On floor near door to killing room

<u>Basement</u>		<u>Rendering Room</u>
18	American Roach	On floor beneath vent fan in west window
17	American Roach	In tool box on wall behind 2nd boiler. Chest high
19	German Roach	On cement pier by outside door
20	German Roach	On metal walk on grinder about chest high, (large hole in wall that was sealed)
138	C.F.B.	On floor in north west corner
97	C.F.B.	On ledge in south wall, chest high
23	C.F.B.	On lard in barrel near rendering vat

Observations on Natural Infestation

During the placing of the test insects observations were made as to the character and location of any natural infestation that might be present. The greatest number of insects were found in the rendering room. All the insects noted were German roaches. The other fumigated areas seemed to be relatively free of any natural infestation.

Fumigation Procedure

Taking in the factors of temperature, wind, and degree of sealing, the following dosages were decided upon: First floor including the killing floor, hall, offices, and men's locker room - 2.4 lbs. of methyl bromide per 1000 cu. ft. Rendering room in basement 3.1 lbs. of methyl bromide per 1000 cu. ft.

The fumigation was started Saturday at 6:00 P.M. and terminated Sunday at 3:30 P.M. Thus the exposure was for about 21 hours.

The amount of methyl bromide left at the end of the exposure period was negligible as shown by a halide leak detector. Therefore an aeration period of not more than 1/2 hour was used to accomplish the clearance of the gas. Aeration was hastened by opening all doors and windows and the operating of one exhaust fan.

The temperature was 42°F. outside and 68°F. inside at the start of the fumigation. The corresponding temperatures at the end were 55°F. outside and 67°F. inside. The weather conditions were heavy clouds, gusty to 15 mile an hour winds. Intermittent rain or snow fell throughout the period.

The cylinders of gas were so placed as to distribute the gas quickly and evenly. No fans were used to assist the distribution.

No articles were removed from the area to be fumigated.

Handling of Meat Samples After Fumigation

After airing for about 2 to 3 hours the fumigated meat samples were prepared for shipment. Each meat sample was divided into two comparable portions. One portion was shipped by Dr. Puppel to the Meat Inspection Division, while the other was

shipped to The Dow Chemical Company. The beef fat samples were taken by slicing from the chunk surface samples about 1/2 inch thick. The pickling brine was sampled with one scoop which filled two sample bottles. The rest of the samples were divided equally.

The unfumigated controls were packed in the same manner. After all of the samples were collected, those going to The Dow Chemical Company were refrigerated and shipped to them via auto. These samples were analyzed by the Main Analytical Laboratory staff.⁽¹⁾

Observation of Insects

The planted laboratory insects were collected in the same order as placed. Each cage was examined for living insects as picked up. The effect of the methyl bromide fumigation upon the natural infestation was observed at the same time. Interesting sidelights were recorded as noted.

Results

All the insects were found to be dead when collected after fumigation. The American roach eggs are being held in the Biochemical Research Laboratory in Midland for further checking. The unfumigated controls were very much alive when checked back into the laboratory.

No living insects were found in the rendering room which was heavily infested with German roaches prior to the fumigation. There was one dead rat found on the floor of the rendering room. Many dead roaches were found in the hide room along the wall which separated it from the rendering room. Evidently they had received a killing dose of the gas before they crawled through one of the many cracks and holes in the wall. One dead mouse was found in

the hide room also.

On the first floor a heavy infestation of German roaches was found dead near those openings leading to the rendering room. No living insects were found in the rest of the killing floor, hall, and offices and comparatively few dead insects were noted. A few dead German roaches were found in the skylight wells.

No objectionable odors due to the fumigation were noted in the plant after the fumigation was completed.

The analyses of the meat samples are given in Table 3.

Table 3 - Total Bromide in Meat Products Fumigated With Methyl Bromide at the Rate of 2.4 Lbs. Per 1000 Cu. Ft.

Product	<u>Grams Total Bromide Per 100 Gms. of Product</u>		
	<u>Analytical Values on</u>		<u>Bromide Residue</u>
	<u>Samples Control</u>		
	<u>Unfumigated</u>	<u>Fumigated</u>	<u>Due to Fumigation</u>
Frankfurter sausage	.0002	.0062	.0060
Pork sausage	.0005	.0052	.0050
Beef fat	.0000	.0008	.0008
Lard	.0000	.0012	.0012
Pickling brine	.0025	.0027	.0002

The "bromide residues" found in this commercially applied fumigation are of the same order as those obtained in the experimental fumigation at the Cudahy Brothers Company, Cudahy, Wisconsin. They are of the same order as those found in most fresh fruits, dried fruits, fresh vegetables, and whole grains, and somewhat less than those generally found in milled grains, cheese, and nut meats when fumigated in a similar fashion.

The general conclusion reached by Dudley and Neal of the U. S. Public Health Service that, "foods fumigated with methyl bromide, under commercial conditions, would, on the basis of our

evidence, probably not contain sufficient quantities of bromine residues to produce deliterious effects," has been substantiated by others in the food industry and again by this test.

- (1) Shrader, S. A., Beshgetoor, A. W., and Stenger, V.A.
Determination of total and inorganic bromides in foods
fumigated with methyl bromide.
Ind. Eng. Chem., Anal. Ed. 14, 1-4 (1942).

SLICED BACON FUMIGATED WITH METHYL BROMIDE

M. A. Wolf

(A Private Communication)

1. Commercially wrapped Swift's Premium Sliced bacon was purchased at a local store. A sample was fumigated as purchased. Another sample was unwrapped and fumigated. A third sample was held as a control.

2. The fumigation was done in an air-tight aluminum vault. The methyl bromide was introduced as a gas at the rate of 2 pounds per 1000 cubic feet and held there for an exposure of 24 hours. These conditions are rigorous ones.

3. The sliced bacon was analysed for total bromides⁽¹⁾ by the Main Analytical Laboratory. The results are as follows:

Wrapped Sliced Bacon	47 ppm Bromide
Unwrapped Sliced Bacon	49 ppm Bromide
Control Sample	1 ppm Bromide

These data indicate that the fumigation of sliced bacon, wrapped or unwrapped, with methyl bromide at the rate of 2 pounds per 1000 cubic feet should not result in high bromide residues. In fact, the residues found lie in the same range as previously reported for other fumigated meat products.

(1) Shrader, S. A., Beshgetoor, A. W., and Stenger, V. A. Determination of total and inorganic bromides in foods fumigated with methyl bromide. Ind. Eng. Chem., Anal. Ed. 14, 1-4 (1942).

Unit Index:

A commercial fumigation of a part of the meat packing plant of Camp Packing Company of Cortland New York was carried out under the directive of Mr. R. M. Mehurin (U.S.D.A.) and under the supervision of Dr. J. D. Puppel Inspector in charge. Using 2.4 lbs. of methyl bromide per 1000 cu. ft. in the better sealed portion and 3.1 lbs. in the poorer sealed portion, excellent insect control was obtained of both the planted insects and the natural infestation. 1 undesirable odors were noted due to the fumigation. The total bromine residue found in the fumigated meat and meat products is of the same order as found in many other foodstuffs fumigated in a similar manner.

Index Headings:

Methyl bromide commercial fumigation of a meat packing plant with.

Meat packing plant, commercial fumigation of, with methyl bromide.

Camp Packing Company, Cortland, N. Y., fumigation of meat pack plant of, with methyl bromide.

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